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ABSTRACT

The General Teaching Model is a procedural guide for the design, implementation, evaluation, and improvement of instruction. The Model is considered applicable to all levels of education, all subject matters, and any length of instructional unit. It consists of four components: 1) instructional objectives, 2) pre-assessment, 3) instructional procedures, and 4) evaluation. The selection and specification of instructional objectives is probably the most important step in the Model. Once an instructional objective is selected, according to one of several possible models, it should be specified in behavioral terms which describe what students are to be able to do upon completing a unit of instruction. Pre-assessment is probably most essential when an instructor is beginning a unit of instruction and is unfamiliar with his students' skills, knowledge, and attitudes. In some situations pre-assessment for each unit may be unnecessary. The design of the instructional procedures involves selecting the modes of instruction which appear most efficient, selecting instructional materials, preparing new instructional materials when necessary, and developing a sequential plan. The most important thing in designing evaluative measures is that the instrument measure the identical behavior specified in the objectives. Limitations of this four-phase system for new "open education" programs have recently been recognized. Work is in progress on revisions for open education. (RT)

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THE GENERAL TEACHING MODEL

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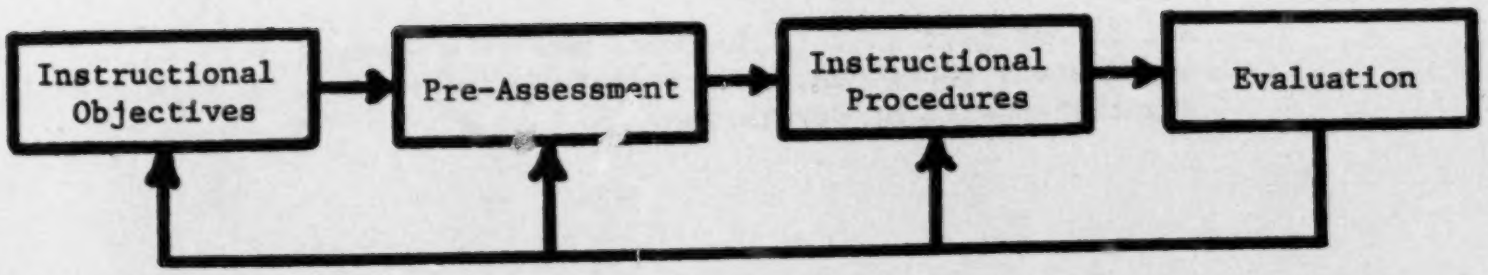

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A more complete treatment of the model presented in this document is contained in the book: Systematic Instruction by Popham and Baker, Englewood Cliffs, New Jersey: Prentice-Hall, 1970.

FOREWORD

The model presented in this document was developed by the first author in 1965. Since that time it has undergone numerous revisions as a result of feedback from application of the model by ourselves and others, plus various developments in education and psychology. Since the last revision we have become aware of several factors which have raised some new questions regarding the model. Although we are still firmly convinced of the validity of much of what is presented in this monograph, there are some areas which we feel require further examination. However, we have decided not to undertake another revision at this time but rather to identify these limitations and to make a more comprehensive revision later.

Since the problems we have found with the model are described with particular reference to ideas presented in this document they may make little sense to someone who is unfamiliar with the model. Thus the limitations are presented at the end of the document.

David T. Miles
Roger E. Robinson

(June 1971)

THE GENERAL TEACHING MODEL

Introduction

The General Teaching Model is a procedural guide for the design, implementation, evaluation, and improvement of instruction. The Model is considered applicable to all levels of education (e.g., elementary, secondary, higher), all subject matters (e.g., english, science, art, vocational), and any length of instructional unit (e.g., one hour, one week, one semester).

The major premise underlying the Model is that the goal of teaching is to maximize the efficiency with which students achieve specified objectives. The Model is based on a technology of instruction which has developed in the past several years from the research and development work in three areas--experimental psychology, military training, and programmed instruction. The three individuals who have contributed most to the specific Model presented in this document are Robert Gagne, Robert Glaser, and James Popham.

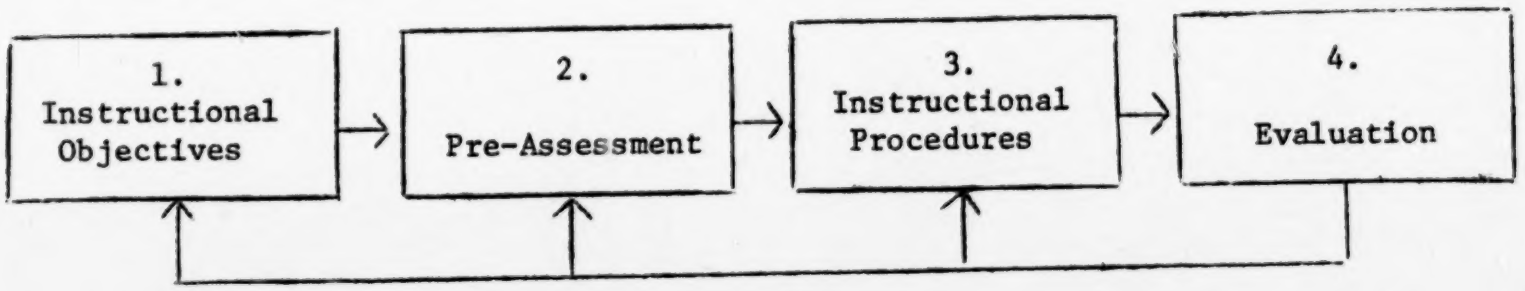
The two major functions of the Model are (1) to guide instructional designers and teachers through the major steps in designing and carrying out instruction, and (2) to provide an overall structure with which to view and study the teaching process. Although the Model itself has not been experimentally validated for teaching efficiency, several of the prescriptive principles contained in it are derived from empirical research. It should also be pointed out that many "good" teachers will find considerable similarity between the Model and the procedures they employ in teaching. Thus the Model might well be described as an attempt to make explicit what makes an effective teacher effective.

The Model should be of most benefit for the beginning teacher; however, experienced teachers may also be able to improve their instruction through

use of the Model. It is also hoped that the model will contribute to the improvement of teacher training by providing the experienced and inexperienced teacher with a common frame of reference for analyzing and communicating about instruction.

Before introducing the Model, one other point should be stressed. The General Teaching Model does not propose to tell teachers what they should teach or what specific instructional methods they should employ. The General Teaching Model presents a guide for the teacher to use in deciding (1) what he would like his students to learn, (2) what instructional methods he should employ, and (3) how to determine whether his students learned what he intended. The range of possible objectives from which a teacher can select is nearly limitless. There are dozens of different methods of teaching and each teacher generally employs each method somewhat differently. A wide variety of equally valid means of evaluation also exists. Each individual teacher must make decisions regarding objectives, instructional procedures, and evaluation on the basis of several factors, such as (1) his personal views of what is important for students to learn, (2) the community and institution in which he teaches, (3) the type of students he has, and (4) his preferences and capabilities regarding instructional methods and resources. The General Teaching Model is primarily concerned with helping teachers teach what, and how, they want to teach as well as possible.

Below is a flow diagram of the General Teaching Model with a brief summary of each component.



1. Instructional Objectives. Instructional objectives are first identified and selected on the basis of an analysis of desired learning outcomes, and then specified in behavioral terms.

2. Pre-Assessment. Prior to beginning instruction, learners are pre-assessed to determine whether they possess the prerequisite knowledge and skill to begin instruction, or whether they have already mastered some of the instructional objectives.

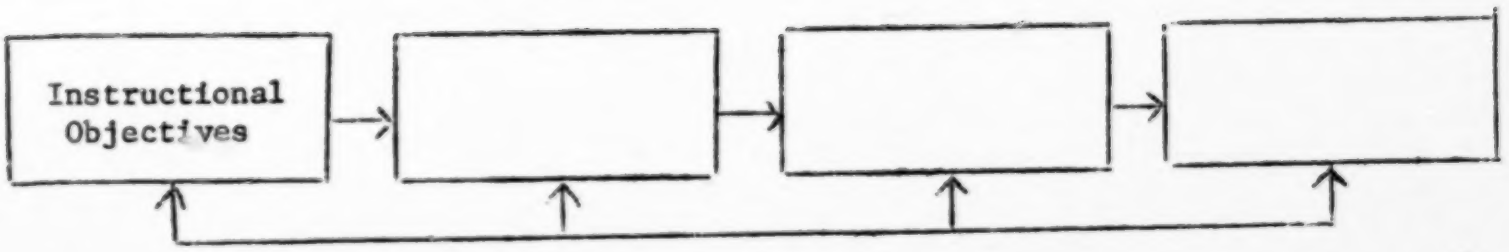
3. Instructional Procedures. Instructional activities are designed to help learners efficiently achieve the specified objectives. Instructional principles, such as motivation, practice, graduated sequence, feedback, etc., plus an analysis of the effectiveness with which the instructor employs various instructional methods (e.g., lecture, discussion, independent study), are employed in the design and implementation of instruction.

4. Evaluation. Instruction is evaluated for efficiency in getting as many students as possible to master as many objectives as possible. Based on the results of an evaluation, modifications are made in the objectives, pre-assessment, and/or instructional procedures, as needed to further maximize instructional efficiency.

The major purpose of this paper is to provide an overview of the General Teaching Model. Upon completing it, it is hoped that readers who are involved in instruction and presently do not use the GTM or similar model will be sufficiently impressed with the potential value of the GTM to:

1. seek and engage in learning activities for the purpose of becoming proficient in using the GTM.
2. employ the GTM in the design and implementation of instruction.
3. recommend the use of the GTM to others who are concerned with instruction.

To use the GTM effectively, considerable knowledge and skill in performing the functions in each component of the Model is required. For those so inclined, a few basic references, which can supply some of the knowledge (but little of the skill), are provided under each component. As mentioned previously, many teachers already possess much of this knowledge and skill and will need only to restructure some of their procedures to successfully apply the GTM. For these individuals, this document may provide sufficient information to begin using the GTM.



Instructional Objectives

The selection, and specification, of instructional objectives is probably the most important step in the Model. This is where the instructor decides what he wants to teach. The two major factors involved in preparing objectives are briefly discussed below.

1. Selection: Decisions regarding the selection of appropriate objectives are usually based on the following factors: (1) what the students should be able to do in instructional units which follow the unit of concern, and after completing their education; (2) what the students are able to do prior to beginning the unit; and (3) the available instructional resources including the instructor's capabilities with his subject matter. Deciding what students should be able to do after completing their schooling or completing a course which is not designed to prepare students for subsequent courses is essentially a value decision. Whether a student "ought" to learn a foreign language or how to solve differential equation must be decided on the basis of what someone or some group thinks students "ought" to be able to do after completing school. On the other hand, decisions regarding (1) what students should be able to do in subsequent courses, (2) what knowledge, skills, and attitudes they should have at the start of a course, and (3) what instructional capabilities are available to teach them, can be made on empirical evidence.

Using this approach, three questions can be asked about each objective considered for selection.

(1) Why should students achieve the objective?

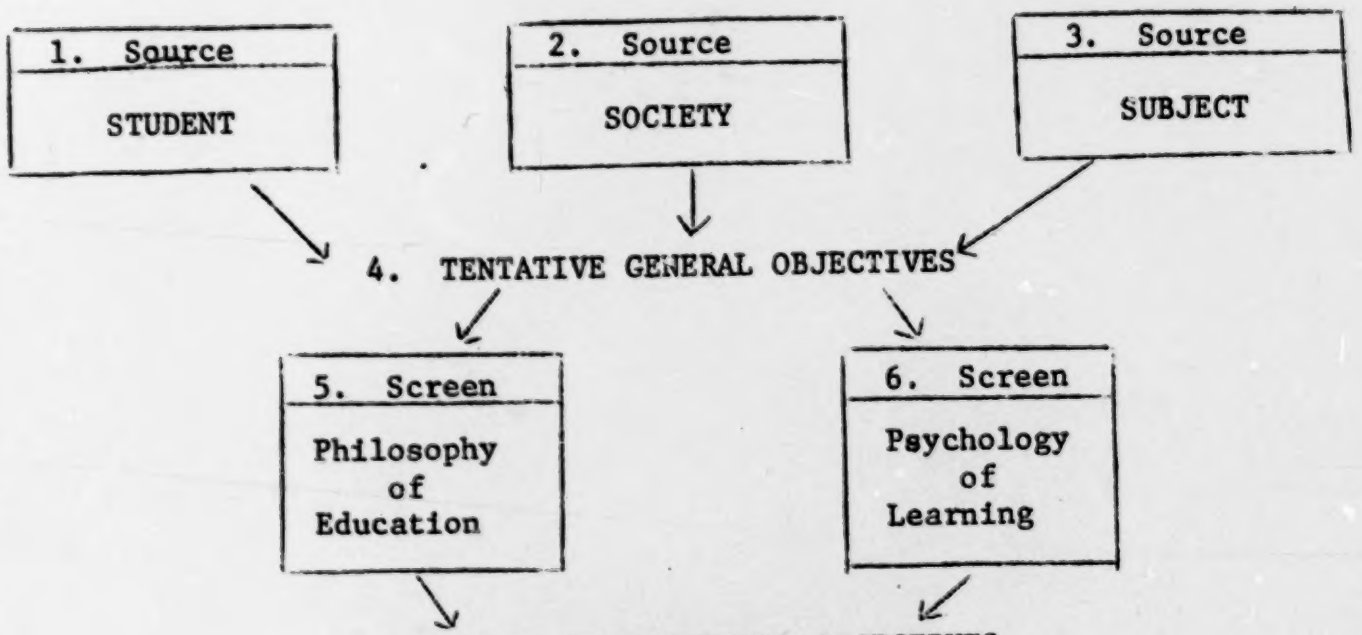
(2) do students have the prerequisites to achieve the objective?

(3) are the instructional capabilities available to permit students to achieve the objective?

Following is another approach to selecting objectives.

The Tyler Rationale

Ralph Tyler proposes the following seven-step model for selecting objectives:



1. Source: what are the students' needs (current status) and interests?

2. Source: what does society want people to be like?

3. Source: what do subject matter experts think people should be like?

4. After consulting above three sources, tentative general objectives should be specified.

5. Objectives which violate the teacher's philosophy of education (what he feels should and should not be taught) should be screened out.

6. Objectives which cannot be achieved based on what is known of the psychology of learning should be screened out.

7. The resulting objectives should be specified in precise terms of intended student behavior.

Another valuable technique which can be employed along with the previous procedures for selecting objectives is the use of a classification system. By writing or selecting objectives according to some classification system, it is possible to (1) select objectives which are the type or level actually desired and (2) avoid selecting an undue amount of objectives of a particular type or level for a unit of instruction. Incidentally, the classification of objectives also can facilitate the planning of instruction and the communication about instruction among people involved in the instructional enterprise.

Probably the most popular classification scheme for educational objectives is that developed by Benjamin Bloom and others (1956). According to this taxonomic system, objectives can first be classified into one of the three following domains of behavior:

(1) Affective objective: An objective dealing with emotions or feelings indicated by words such as interest, appreciation, enthusiasm, motivation, and attitudes.

(2) Cognitive objective: An objective which deals with the thought processes (knowledge, intellectual skills such as analysis, problem solving, evaluation) rather than with the affective or psychomotor behaviors.

(3) Psychomotor objective: A statement specifying performance involving physical movement, acting on some part of the environment.

Actually, most objectives do not belong exclusively to only one of these domains. There is usually some element of each in all objectives. However, it is usually possible to determine whether the predominant characteristic of an objective is affective, cognitive, or psychomotor. A hierarchical breakdown according to types or levels of behavior has been developed for each domain; however, the subclassifications for the affective and psychomotor domains have not been extensively used to date. Most objectives for elementary, secondary, and higher education fall into the cognitive domain and several

sub-classification systems for this domain have been developed. Two of the most commonly used systems are Bloom's Taxonomy, which includes the following major subcategories: (1) knowledge; (2) comprehension; (3) application; (4) analysis; (5) synthesis; and (6) evaluation, and Gagne's eight types of learning, which include: (1) signal learning; (2) stimulus-response learning; (3) chaining; (4) verbal association; (5) multiple discrimination; (6) concept learning; (7) principle learning; and (8) problem solving.

Another important factor to consider in selecting objectives is the distinction between "terminal" and "enroute" objectives. Terminal objectives refer to what a student should be able to do at the end of some unit or series of instructional units which is not followed by further instruction. Enroute objectives refer to what a student should be able to do at the end of some unit of instruction which will permit him to proceed to a subsequent unit. With terminal objectives the justification or rationale for the objectives is based on what the person is to do in the "real" (non-academic) world. The rationale for enroute objectives is based on the performance expected of students in the units or courses to follow.

In an earth science course the teacher may have as one of his terminal objectives the following:

When the student encounters an article in the popular media dealing with earth processes as related to some social issue, he can critically analyze the article by identifying errors in logic, scientific facts, inferences, and/or predictions. He will offer alternatives to the errors detected and provide justification for the changes.

One of the many enroute objectives to reach this terminal goal may be: The student can define ion, state the names of five (5) common ones, and classify them according to some pre-designated scheme.

The rationale for the enroute objective is its usefulness in achieving the terminal goal. It is derived by an analysis of the terminal goal to determine what enroute objectives are necessary for success in achieving the terminal objective. The terminal objective does not appeal to a higher instructional objective for its justification, it stands on its own as a goal tied to the real world, not as preparation for further instruction.

2. Specification: Once an instructional objective is selected, it should be specified in behavioral terms which describe what students are to be able to do upon completing a unit of instruction. Following are eight examples of behavioral objectives:

(1) Confronted with two transcripts of political campaign speeches from opposing parties, the student will identify statements which contain the following: errors in reasoning, irrelevant arguments, unwarranted generalization, and invalid conclusions. As a minimum, the student must identify all such statements identified by the course instructor.

(2) Upon completion of a novel, the student will relate the novel to his experience in any one of the following ways: (1) by discussing why he could or could not identify with any of the characters; (2) by stating what new ideas the author has presented, or what old ideas have been presented in a new perspective for him; (3) by discussing any particular passage or incident which evoked strong feeling in him.

(3) Given a copy of the state criminal code, a statement of his own moral code which he has previously defined, and descriptions of various acts performed by individuals with all relevant circumstances, the student will identify each act as one of the following: illegal and immoral; illegal but moral; legal but immoral; legal and moral; or not covered by either the state code or his personal code.

(4) After completing this course on modern fiction, students will: (a) elect to take more fiction courses in the future; (b) read more novels than they did before taking the course; and (c) join a formal or informal book discussion group.

(5) When given specimens of ten previously unencountered organisms, the student will classify at least seven of them under the proper kingdom, phylum, and class.

(6) Given a common social problem (narcotics, integration, delinquency, etc.), the student will be able to apply the problem-solving procedure taught in class to analyze the problem and to produce three possible approaches to a solution.

(7) The student will produce a collage which expresses his personal interpretation of a recent historic event. The collage must (a) incorporate at least three of the collage techniques presented in class, (b) contain sufficient visual information for the majority of the class to identify the historic event, and (c) be different in both form and content from the collages produced by the other students in class.

(8) By the second semester of a course in social problems, the student will, after a classroom discussion in which he has participated and in which note-taking was not permitted, summarize in his own words at least five points made by other students in the discussion. The students who made the five points must agree on the accuracy of the summaries.

In contrast, non-behavioral objectives are written statements which typically describe one or more of the following:

a. Topics or material to be covered in a unit of instruction, e.g., this course will deal with the current existential movement in underground films.

b. Activities in which students will engage in a unit of instruction, e.g., students will see and discuss several films currently being shown on the underground circuit.

c. What students should "learn", "know", "understand", or "appreciate" as a result of completing a unit of instruction, e.g., students will learn to appreciate the major film interpretations of existential philosophy.

Although the information provided by this kind of objective does tell something about what students may learn in a unit of instruction, the actual behavior students will be expected to exhibit to demonstrate mastery of a unit is not specified. Following are seven examples of <u>non</u>-behavioral objectives:

(1) Students will learn to critically analyze political points of view.

(2) This unit will deal with personal interpretations of novels.

(3) This course will cover legal and moral codes.

(4) Students will gain a deep appreciation of modern fiction.

(5) Students will understand the taxonomic classification system in biology.

(6) At the end of this unit, students will know the problem-solving procedures presented in class.

(7) The class will learn to make collages.

(8) The students will learn to listen in discussions.

Robert Mager suggests that behavioral objectives should contain the following three elements:

1. Conditions: a description of the class of stimuli to which the student is to respond (e.g., the type of questions, tasks, or problems, and the form in which they will be presented, the relevant conditions under which the student will be expected to perform--materials or equipment which will be available, environmental conditions which may affect the performance, special physical or psychological demands which may exist).

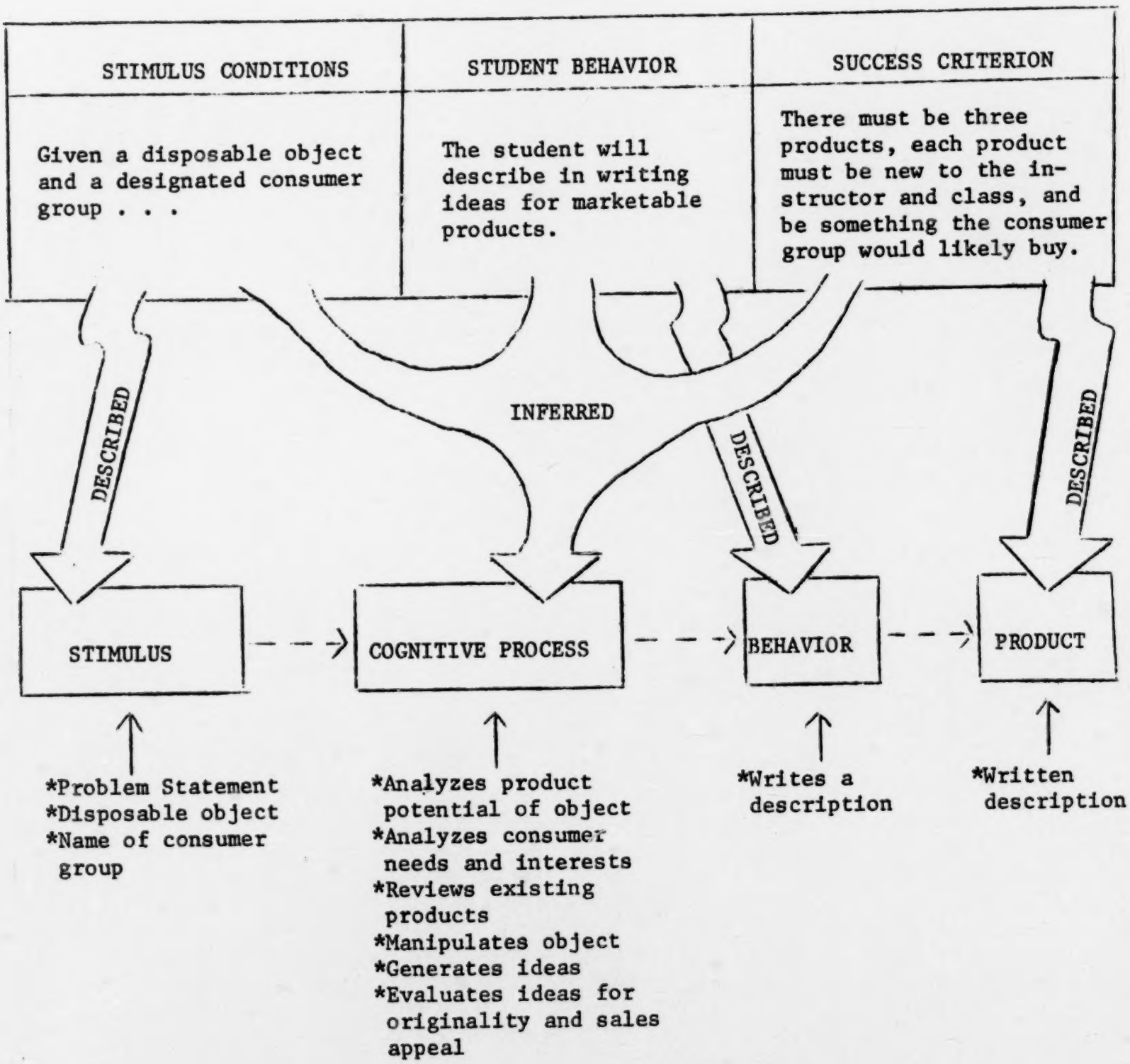
2. Behavior: a statement containing an action or behavioral verb which connotes or denotes the behavior the student is to perform (e.g., identify, write, describe, solve, classify) and a general reference to the product of the student's behavior (e.g., an essay, a diagram, a three-dimensional model).

3. Criteria: a description of the success criteria by which the student's behavior is to be judged acceptable or unacceptable (e.g., correctly applies three principles, identifies 8 out of 10, solves the problem, the idea must be different from any in the textbook, discussed in class, or produced by other students).

One of the most important qualities of behavioral objectives which contain these three elements can be shown with the diagram below of the following objective:

> Given a common disposable object (e.g., paper sack, bottle, cardboard box, plastic container) and the designation of a consumer group (e.g., 6-10 year olds, college students, housewives), the student will describe in writing ideas for at least three original marketable products. Each of the three products must be previously unknown to the instructor and class, and be something the target group would be likely to buy, as judged by class vote.

INSTRUCTIONAL OBJECTIVE



This diagram attempts to illustrate the function of each component of the objective. The description of the stimulus conditions with which the student will be confronted and the performance expected of the student permit inferences to be made regarding the cognitive processes required of the student.

Although it is seldom, if ever, possible to determine the precise nature of the cognitive process which occurs within people, it is possible to infer some of the general characteristics of such activities. The student behavior component defines the behavior to be employed in order to expose his solution. The criterion component serves primarily as a guide to the student and the instructor regarding the important characteristics of his behavior, or in this case, the product of his behavior, which must be present for the performance to be considered successful. This component also provides some inferential information regarding the requisite cognitive processes.

Several other functional features of behavioral objectives could be pointed out here, but the major intent is to show the relationship between behavioral objectives and cognitive processes.

James Popham has also recommended recently that objectives should be written at a moderate degree of specificity--avoiding grossly general and minutely specific extremes. For example, five or six objectives for a semester course would probably be insufficient and one objective for every item on every test would result in objectives which were too specific. It is impossible to suggest an ideal level of specificity for each unit of subject matter, but Popham offers one useful guideline--objectives should be written so that achievement of them can be measured by more than one test item. For example, achievement of this objective: "the student will correctly add any pair of two-digit numbers," can be measured by a large variety of test items; while achievement of this objective: "the student will correctly add 34 and 75," can be measured by only one test item. Following is a more realistic illustration of the contrast: "the student will be able to identify the structure in any of Mark Twain's books," versus "the student will be able to identify the structure in

Mark Twain's book "Tom Sawyer."

Another general guideline for specifying objectives is that the performance required by an instructional objective should match as closely as possible the post-instruction performance expected of course graduates. For example, if after instruction students should be able to lead group meetings with urban street gang members for the purpose of developing and implementing neighborhood improvement projects then the instructional objectives should require students to successfully perform behaviors as closely associated with this task as practically feasible. More specifically, the actual stimuli to which the course graduate is to attend (street gang members, neighborhood conditions, meeting places, group dynamics, etc.) and the responses he is to make (establishing a non-competitive climate, supporting productive participation, summarizing, reducing tension, etc.) should be as closely approximated in the instructional objective as possible. This guideline is considered applicable to general educational goals as well as specific training objectives, although the identification of post-school application of knowledge of such subjects as philosophy, history, higher mathematics, etc., has not been a popular practice with educators in these fields.

As mentioned above, most of the emphasis in school subjects is on cognitive objectives. Recently however, more and more attention is being paid to affective goals. One reason for this is the pervading influence which attitudes have on behavior. For example, many educators take the position that the most effective kind of instruction is that which gets students vitally interested in a subject. Once a student is "hooked" he may tend not only to learn more during the time he is under the instructor's influence, he will be more likely to pursue the subject after completing the course. When contrasted with some teachers in

whose courses students master enormous amounts of cognitive material but end up despising the subject to such a degree that they avoid any further contact with it, there appears to be some support for attending to attitudinal goals.

Another issue regarding instructional objectives is the matter of permitting students to participate in the selection and specification of goals. Researchers have frequently found that when students choose their own learning goals they tend to achieve the goals more rapidly than when the teacher has exclusive control over the selection of objectives they are to achieve.

Thus some procedure whereby students can select from several alternative objectives for each unit, or where students identify general goals and with the teacher's help translate the general goals into specific objectives could have valuable motivational benefits. Generally with this latter procedure teachers would establish certain subject matter boundaries within which students should identify their goals. Another procedure is for the teacher and the students to each select a certain percentage of the objectives for the course. The teacher could then be assured that students will master the cognitive objectives he considers essential for success in subsequent units or courses and also increase the likelihood that students would acquire more favorable attitudes toward the subject. Of course, no matter who chooses the objectives, they should be specified in behavioral terms.

Although it may not be immediately apparent, the use of behavioral objectives may influence instruction in many ways. Some of the more important potential benefits of using behavioral objectives are as follows. Behavioral objectives can:

(1) facilitate instructional design and development by providing clear goals to work toward.

(2) facilitate curriculum development -- sequencing, eliminating gaps and overlaps.

(3) promote more efficient communication between teachers, administrators, researchers, students, parents.

(4) make evident what students actually learn, thereby permitting selection of most important goals.

(5) permit instruction to be evaluated and thereby improved.

(6) promote individualized instruction by making possible criterion-referenced evaluation -- each student can be required to master all objectives. (Independent learning is also promoted.)

(7) permit students to be more efficient learners, when they find out what is expected of them.

(8) eliminate the time wasted when students can already achieve all or some objectives before beginning a course (proficiency and advanced placement exams.)

(9) tend to impose a philosophy of teacher responsibility for getting students to master objectives.

(10) promote the idea of behaviorally analyzing all components of instruction--entry behavior, intermediate behavior, and terminal behavior.

(11) facilitate research in education -- advance instructional technology.

(12) promote a new role for teachers -- instructional designers, managers, and resource specialists as opposed to information dispensers.

Another issue which is probably much more apparent than the above virtues of behavioral objectives is that writing behavioral objectives is an arduous and time consuming task -- a task for which many teachers have neither the training or time to tackle. Fortunately, though, several individuals, institutions, and groups (educational laboratories, research centers, curriculum development projects, etc.) have produced, and are producing, behaviorally stated objectives for many levels of many subject matter areas. It should soon be possible for educators to select from a wide range of alternatives those objectives which are most suitable for the requirements of their particular instructional situation.

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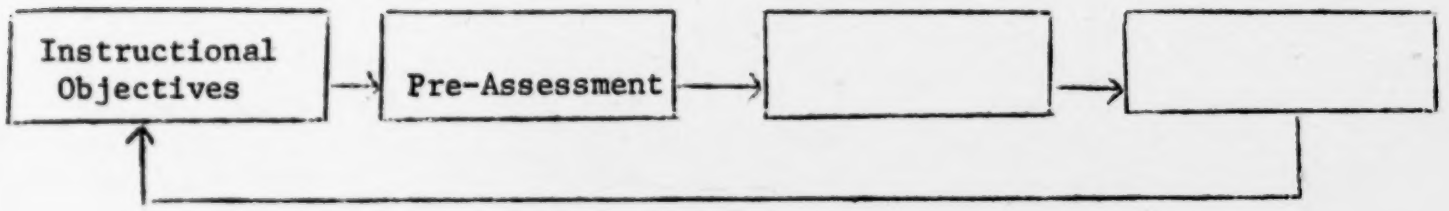
The following Filmstrip-Tape Programs produced by Vimcet Associates, P.O. Box 24714, Los Angeles, California 90024.

- #8 A Curriculum Rationale
- #1 Educational Objectives
- #3 Selecting Appropriate Educational Objectives
- #10 Identifying Affective Objectives
- #9 Defining Content for Objectives
- #4 Establishing Performance Standards

An educational objectives exchange has recently been established to serve as a collection in dissemination agency for behaviorally stated objectives for all subject matter areas. To inquire about obtaining objectives write to: Instructional Objectives Exchange, Center for the Study of Evaluation, UCLA - Graduate School of Education, Los Angeles, California 90024.



Pre-Assessment

Prior to beginning a unit of instruction, it is desirable to assess students to determine: (1) how much of what is to be learned in the unit they already know; (2) whether they have the prerequisite behavioral capabilities for the instruction to follow; and (3) the instructional activities which should be prescribed for each student. Of course, the assessment should be based on the specific instructional objectives specified for the unit. The results of this assessment should provide information (1) as to whether any students may omit any of the objectives in the unit; (2) whether any students should be required to master prerequisite skills prior to beginning the unit; and (3) for prescribing specific instructional activities for specific students.

As most teachers know, when group-paced classes contain students with wide ranges of knowledge and skill, everyone usually suffers. The fast students are held back, the slow students get left behind, and the teacher is constantly frustrated by trying to provide learning activities which accommodate most of the class. The most obvious solution to this problem is individualized

instruction, and perhaps the next best plan is some form of tracking. But in situations where neither of these alternatives exist, some other solution must be sought.

By establishing minimal performance standards for beginning a course, the instructor has a legitimate basis for requesting that some procedure be established for students to acquire the prerequisite skills for entering the course. Such procedures would include prerequisite courses, or independent study programs. If, on the other hand, these procedures are also not available, it seems that some form of subgrouping with different levels of objectives for different groups is the only feasible solution. This solution is, of course, most undesirable for sequential subjects such as reading and mathematics, since many students are typically "passed" to the next course or grade without having achieved the level of performance considered necessary for succeeding in the next course. These students eventually build up a cumulative deficiency which makes academic success impossible. In subjects and courses which are not sequentially dependent (i.e., where mastery of each unit or course is necessary for succeeding in subsequent units), it is probably unnecessary to attempt to get all students to master the same level of achievement. Thus, specifying different performance standards for different individuals or groups is reasonable, and can be done on the basis of the student's pre-assessment performance.

Hopefully the trend toward individualized, self-paced instruction will continue and will eventually reduce or eliminate the problems inherent in instruction which is group-paced and controlled by fixed time schedules for completing units and courses.

Pre-assessment is probably most essential when an instructor is beginning a unit of instruction and he is unfamiliar with his student's skills, knowledge,

and attitudes regarding the material to be covered in the unit. However, in situations where instructors have the same students for a semester or a year, pre-assessment for each unit may be unnecessary. In courses which are sequential in nature, the successful completion of one unit should serve as evidence of the student's capability of entering the next unit. Thus, an extensive pre-assessment would only be necessary at the beginning of a course sequence or semester-long course.

For shorter units (one-week to a month) which are not in a sequential progression, less extensive pre-assessment would be appropriate. A few items from the end -of-unit evaluation could be used. A short interview with each student, or an informal class discussion could be employed to reveal the general level of student's preparation for beginning the unit. By such informal techniques students who appear to have either considerable knowledge, or inadequate knowledge regarding the objectives to be achieved for a unit can be identified and provided with a more extensive pre-assessment to determine what specific objectives can be omitted and what specific prerequisite skills are needed.

Selected References on Pre-Assessment

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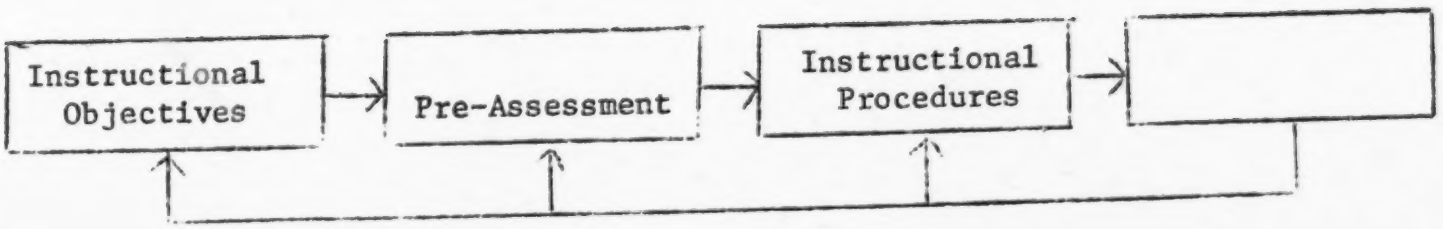
(also see the references under Evaluation)



Instructional Procedures

After students are pre-assessed and adjustments made, such as adding or eliminating objectives or requiring prerequisite learning, the instructional procedures are implemented. The design of the instructional procedures involves: (1) selecting the mode(s) of instruction which appear most efficient for getting the most students to achieve the specified objectives; (2) selection of available instructional materials (e.g., books, films, lesson plans); (3) preparing new instructional materials when necessary; and (4) developing a sequential plan which takes students from where they are at the beginning of a unit to mastery of the unit objectives. When possible, these decisions should be based upon research evidence. The ten generalizations specified below are, to a large extent, based upon research evidence and are examples of principles which should be consulted in designing instructional activities. It should be noted that every application of these principles will not automatically apply to all students and all subject matters. Students vary in the way they learn, subject matters vary in their structures, and teachers vary in the way they interpret and apply principles of instruction. Thus, applications of these principles in each situation and with each student must be continually tested. The ten principles are discussed below.

1. Pre-Learning Preparation. Learners must have mastered the prerequisite behavior for succeeding in new learning experiences. Learners also should be prepared for new learning experiences by warming up, being informed of

what previously learned behaviors will be helpful or harmful, and acquiring an appropriate "set" (predisposition to respond in a particular way) for what is to follow. For example, a preview at the beginning of a chapter or film can increase learning efficiency. Providing students with the instructional objectives for a unit has also been found to facilitate learning.

2. Motivation. Students are more efficient if they have a desire to learn what is being taught. This desire can be promoted by convincing learners of the value of mastering the subject matter and by making goals which they already desire (e.g., acquisition of desired information or skills, social approval, grades, etc.) available to them for accomplishing learning objectives. Selecting subject matter that interests and/or permits students to participate in planning their educational activities can increase their desire to learn. The learning task should be presented in such a way that the learner feels challenged and also confident that he can succeed. Shaping favorable attitudes toward the subject matter, the instructor, learning, and education in general can have positive long-range consequences for student achievement.

Because motivation is such a critical variable in learning, it is treated in more depth here than the other nine instructional variables. On the following page is a table entitled "Motivation for Learning". This table is an attempt to summarize the major categories of motivation schemes. Careful study of this table will show a movement toward less abstract motivational systems from one to five. You may also feel that it is necessary to make value judgments among the five categories. Typically we place the most value on the schemes described in numbers one, two, and three, and show less preference as the motivation becomes less abstract. In all of the categories, there are implications for the teacher to have some influence in motivating a student.

Goal or Incentive	"The Student Learns--(to add fractions, or write paragraphs, or build models) because.."	How Motivation May be Developed and Maintained
1. To know (Immediate intrinsic)	...he just likes to know the how and why of things. Satisfying his curiosity or acquiring knowledge and skill is what its all about--whether he ever uses what he learns is unimportant (epistemic curiosity).	Provide opportunities for the student to inquire and learn about whatever turns him on. Supply information and materials only when requested. Give no extrinsic rewards (praise, grades, etc.) for learning.
2. To be able to do something (related to what is learned) in the distant future. (Delayed intrinsic)	...he will eventually be able to use what he learns to do pleasureful and necessary things, i.e., read sexy novels, complete income tax forms, understand scientific advances, vote intelligently, raise children.	Show and frequently remind the student of the eventual value of what he is to learn. Encourage self-directed learning, minimize teacher-directed learning and use no extrinsic rewards.
3. To be able to do something (related to what is learned) at the present time. (Immediate intrinsic)	...he needs the knowledge or skill to do something desirable, now--i.e., play a game, write a poem, identify trees, communicate ideas, fix a car, train an animal, understand Apollo 11.	Provide or arrange opportunities for student to do things which require learning. Expose potentially interesting things; pose tasks, games, questions, problems; suggest projects; supply information, materials, encouragement, and feedback; provide frequent opportunities to use what is learned.
4. To obtain future benefits and rewards unrelated to what is learned. (Delayed extrinsic)	...he wants to pass tests, get good grades, obtain a degree, receive awards and honors, get a good job, own three cars and an Irish wolfhound; he may also want to gain the respect and admiration of his parents, friends, or professional community.	Use minimal extrinsic rewards. Point out and remind student of potential future rewards for present efforts. Use some immediate extrinsic rewards when future reward is distant but reduce their use as student progresses.
5. To obtain immediate benefits and rewards, unrelated to what is learned. (Immediate extrinsic)	...he wants to obtain immediate rewards such as the following: a) social rewards - smiles, verbal praise from teacher, parents, peers. b) general rewards - free time, choice of activities, money, c) specific rewards - gold star, food, toys, field trip, play ball.	Identify or develop effective rewards (reinforcers, i.e., things student wants) systematically deliver rewards for appropriate behavior and withhold for inappropriate behavior. Use tokens or point system to facilitate observation.

There is little hope in taking a position that motivation is entirely a self-generated phenomena residing totally within the student. If one takes this position, it offers no possibilities for the teacher to manipulate the environment to improve motivation. In fact, whatever position one takes, it must be conceded that it is not possible to absolutely confirm anyone's motives. Also, most people are probably operating under all of these motivation systems, depending upon the circumstances of the moment.

All of the schemes presented in that section deal with positive or non-aversive styles. In each case there is a positive or desired consequence following learning which motivates the student. There is no mention of the "other side of the motivation coin." This would be aversive control, or motivation due to avoidance of negative or undesirable consequences, or escape from aversive situations.

It may be that a major portion of a learner's behavior is in the form of avoidance or escape behavior. The student performs to avoid a spanking, verbal harassment, loss of privileges at home, etc. This type of motivation scheme is at times more common because it is more easily set up. We often are told what bad things will happen if we do not attend class or prepare our lessons. Detention, probation, expulsion, retention in a grade, and many other things are specified as consequences for non-performance. We have learned well how to tell people what they <u>should not do</u>, and the consequences. We are less sophisticated in our ability to say what a student <u>should do</u>, and the positive outcomes.

Although the evidence from research is not conclusive, learning for desirable outcomes, as perceived by the learner, may be more effective than aversive control in achieving both cognitive and affective objectives.

3. Providing a Model of Terminal Performance (Mastery). When possible, learners should be shown examples of what they are to produce or do at the end of a learning experience. Imitative learning is one of the most effective procedures by which humans acquire new behaviors. For example, providing students with sample term papers, previously completed projects, final exam papers, or demonstrations of the desired performance can dramatically facilitate learning.

4. Active Responding. At the outset of instruction, learners can profit from watching or listening to someone else perform the acts to be learned, but most learners will become proficient only if they perform the acts to be learned. Thus, it is what the learner does--not what the teacher does--which determines learning. With verbal presentations (oral or written), interspersed questions can insure that learners are attending to, and acquiring, what is intended. In learning verbal material from a textbook, most students can profit by overtly reviewing what they have read while not looking at the material. The stimuli to which learners attend and the responses they make in the learning task should match as closely as possible the stimuli and responses in the terminal instructional objective.

5. Guidance. Learners should be given guidance and prompting when attempting to demonstrate new behaviors to be learned. Such prompts should be eliminated gradually so the learner is able to perform the task without them. For example, verbal guidance could be given for each step in carrying out long division problems--then the verbal prompts should be eliminated gradually.

6. Practice. Opportunities should be provided for learners to repeatedly use newly learned behaviors. Since most instruction is designed to provide knowledge and skills which are to be used sometime after completing instruction, something must be done to insure that what is learned will be retained and transferred to

the post-instructional situation. Over-learning, which involves repeatedly using or practicing a newly learned behavior, can greatly facilitate retention. Practice and reviews which are spaced periodically after initial acquisition is also an effective procedure. With skills which require performance with a variety of tasks and situations, practice should be provided with varied tasks and situations. Practice will also be more effective to the extent that the behaviors practiced are similar to behaviors to be performed in the future (the terminal objectives). For example, after initially learning to subtract, practice with a variety of number combinations should be provided.

7. Knowledge of Results. Learners should have prompt and frequent knowledge of the success of their responses. The learner must find his success rewarding in order for the behavior to be reinforced. Ideally, the learner should know an instant after he makes a response whether it is appropriate or not. When possible, the learner should be provided with the criteria to evaluate the correctness of his own responses. When the learner is personally confident of the correctness of his response, external confirmation may be unnecessary, but when he is unsure, such feedback is generally desirable. When a learner's response is incorrect, he should be informed of the correct response.

8. Graduated Sequence. Subject matter should be organized in a hierarchical form from the simple to the complex--from the familiar to the unfamiliar. The steps should be paced so that the learner succeeds in each step, but does not become bored. One approach to sequencing instruction involved a careful analysis of each terminal objective, identifying the particular stimuli to which the student responds and the responses he is to make. Then by asking what must he be able to do (skills, knowledge) immediately prior to performing the terminal behavior, another objective can be stated. The same question is then asked

again and again -- each time specifying objectives which are prerequisite to performing objectives at the next higher stage -- until eventually the instructor arrives at the behavior with which he expects his students to begin the course or unit. Thus, by working backwards a sequence of enroute or intermediate objectives are identified which should lead a student from entry to mastery of the objective.

It also has been found that permitting students to follow their own sequence in achieving well-defined objectives can improve upon teacher-designed learning sequences (Mager and Clark, 1963).

9. Individual Differences. People learn at different speeds; thus, learning experiences should be designed in such a way that each student may proceed at his own pace. Some students will require considerable practice to master a concept, while others may acquire the same concept upon first encounter.

10. Classroom Teaching Performance. Skills in stimulating interest, explaining, guiding, identifying and administering reinforcers, and managing classroom behavior can make an enormous difference in instructional effectiveness. Unfortunately, such social skills are often the most difficult to learn, but some current work on the analysis of social and personality factors in teaching show promise of reducing some of the complexity. The changing role of the teacher from information-dispenser to the manager of instructional experiences is also an encouraging development.

There are several distinguishable modes of instruction, of which the following are among the most frequently used.

(1) The lecture
(2) The discussion class
(3) The recitation class
(4) The laboratory class
(5) The tutoring session

(6) The demonstration
(7) Independent study
(8) Programmed instruction
(9) Reading (books, articles, etc.)
(10) Motion pictures, television, filmstrips

Each of these modes can be analyzed in terms of the extent to which each of the ten principles of instruction, described previously, can be effectively applied. The result of such an analysis can then be consulted in determining which mode or combination of modes would offer the most efficient instructional procedure for achieving particular objectives. Generally speaking,

(1) Pre-learning preparation can be accomplished with all modes.

(2) Most modes can be employed to motivate students; however, extensive use of lectures, recitation classes, and some programmed instruction materials often has detrimental effects on student motivation.

(3) Most modes can be used to provide a model of terminal performance--but unfortunately they are rarely used for this purpose. Demonstrations are probably the most frequently used technique for showing students what they are to learn.

(4) Active responding, guidance and prompting, practice and knowledge of results are rarely provided for with lectures, demonstrations, and films but are usually well provided for with tutorial and programmed instruction.

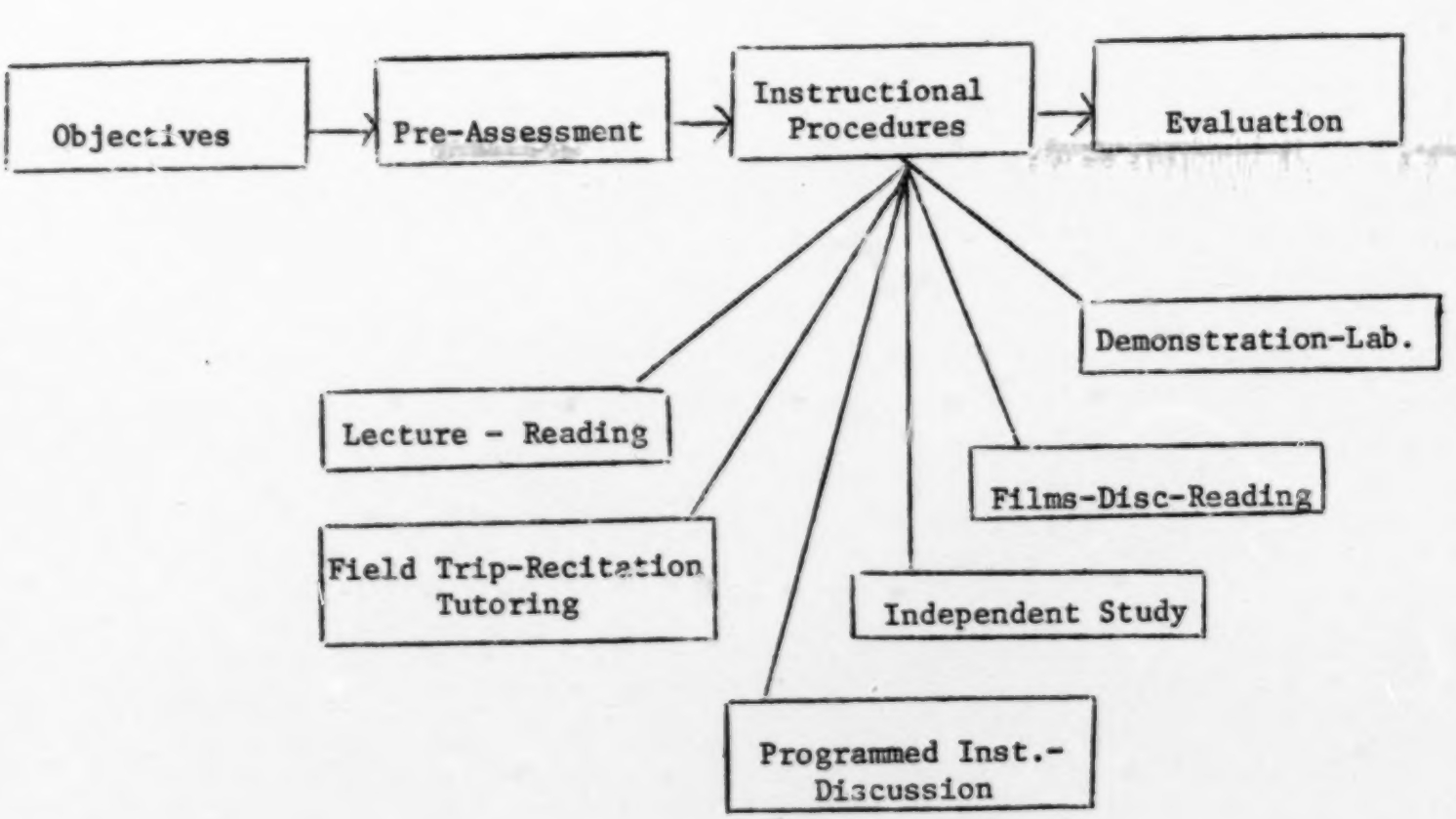
(5) Most modes can be used in a progressive sequence of instruction, but again tutorial and programmed instruction are often the most systematically sequenced modes of instruction.

(6) Tutorial instruction, programmed instruction, independent study, and often laboratory or studio instruction are the modes which are generally most responsive to individual differences.

(7) The modes typically employed in group-paced instruction (i.e., lecture, discussion, recitation, and demonstration) usually require considerable extemporaneous ability and a high degree of social awareness. Success with more individualized modes (i.e., programmed instruction, independent study) is more dependent upon a teacher's ability to select, prescribe, and evaluate the effectiveness of learning activities.

In selecting modes of instruction the instructor should take into consideration his own strengths and weaknesses in using each mode. For example, if an instructor is a highly stimulating speaker, it would be reasonable for him to

give an introductory lecture to stimulate his student's interest (motivation) in a new unit. On the other hand, an uninspiring speaker should probably use another means to motivate his students--such as a film, a thought-provoking article, a field trip, a group discussion, or even a visiting speaker. Similarly, a teacher who has a tendency to dominate group discussions should either employ discussion procedures which exclude him from participating or avoid using discussions. The availability of various alternative modes of instruction which might be employed can be depicted in the GTM as follows:



Most of the ten principles of instruction and the alternative modes of instruction are concerned with the achievement of cognitive goals. Unfortunately, little concrete information is available regarding the most effective procedures for achieving affective goals. Perhaps among the few generalizations which can be made would be (1) to permit students to have as much control over what and how they learn as is feasible, (2) to try to select objectives and learning experiences which would be of interest to the students, (3) to provide learning activities which are challenging but with which a student can succeed, (4) for the instructor to attempt to win the respect and affection of his students, and (5) the instructional environment should be made as pleasant and comfortable as possible (from the student's point of view); e.g., this would include concern for such obvious factors as temperature control, elimination of visual and auditory distractions, use of comfortable furniture. In addition, the use of stimuli which have positive associations for the students might be introduced (e.g., rock music before class begins, inclusion of humor in instructional presentations, use of current and "relevant" examples to support a point, use of graphic and visual media in the contemporary idiom).

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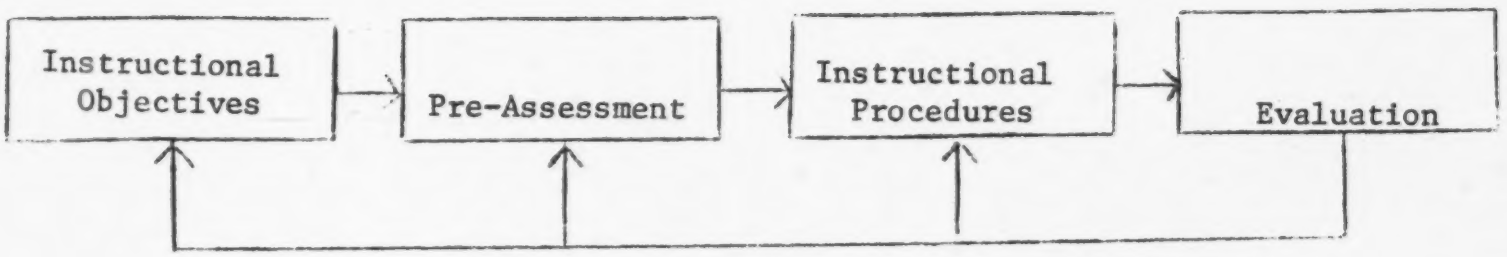
The following Filmstrip-Tape Programs produced by Vimcet Associates, P.O. Box 24714, Los Angeles, California 90024.

#5 Appropriate Practice
#6 Perceived Purpose
#11 Analyzing Learning Outcomes
#12 Knowledge of Results
#13 Teaching Units and Lesson Plans
#15 Discipline



Evaluation

When students complete an instructional unit, they are evaluated to determine whether the instruction was successful in achieving the unit objectives. Typically, this involves the administration of tests and instruments to measure the acquisition of knowledge, skills, and attitudes. If the objectives have been clearly specified, test preparation is quite simple. Probably the most important thing in designing evaluative measures is that the instrument measure the identical behavior specified in the objectives. It is also important to note that it is the success of the instruction--and not the success of the pupils--which is being evaluated.

Two general types of instructional evaluation which have been identified are: (1) "criterion-referenced" evaluation, which means that each student's performance is judged according to some set standard; and (2) "norm-referenced evaluation, the system in which a student's performance is judged according to how it compares to the performance of a group or class of which he is a member. Each of these types of evaluation are typically used for different purposes. The two major purposes of criterion-referenced evaluation are:

(1) to evaluate the effectiveness of instruction.

(2) to determine whether each student achieves the objectives in a unit.

The two major purposes of norm-referenced evaluation are:

(1) to determine how students performed in a course in comparison with each other.

(2) to produce academic performance data (grades, marks) for making decisions about admission to schools and special programs, retention in school, scholarships, honors programs, etc.

In many instances in instruction it is desirable for all students to master all objectives to some specified level of performance. This is particularly true in reading and some arithmetic skills. Other subjects or courses which have a sequential progression also frequently require all students to achieve a given level at each stage to succeed in following units. In these instances a criterion-referenced evaluation system would seem to be the most appropriate procedure.

When an individually-paced instruction system is being employed and all students do not achieve the criterion for acceptable performance in a unit after having ample time to complete the unit, an explanation must be sought from among the following reasons: (1) the unsuccessful students were inadequately prepared for the unit which could mean that the objectives were unrealistic or that the students should not have begun the unit without prior training, and/or (2) the instruction was improperly designed or implemented; for example, ineffective motivation procedures were employed, or insufficient time for practice was provided. Changes in the objectives, the post-instruction evaluation procedures, the instruction, or the pre-instruction evaluation should be made on the basis of the evaluational results (note the feedback loop on the GTM flow chart). In addition to making changes based on observed results,

modifications in these elements should also be made on the basis of new developments in materials and techniques, new research findings, and changing values.

When group-paced instruction is used, it is usually unrealistic to expect all students to master all objectives for each unit. Students learn at different rates and at the end of a unit students will have achieved differing levels of mastery. However, the criterion-referenced strategy can still be used in these instances to determine how many objectives each student achieves and thus the effectiveness of instruction can be described in terms of the percentage of students achieving various levels of mastery. When it is not essential for all students to achieve a given level of mastery, this would be an appropriate procedure.

There are also many instructors who feel that all students should achieve a common set of goals; and in addition, each student should have the opportunity to go beyond these basic requirements and pursue individual interests. The criterion-referenced approach can be used here for evaluating achievement of the required objectives and also the optional objectives if desired.

As pointed out previously, the purposes of norm-referenced evaluation systems do not include determining whether students achieved specified objectives or evaluating the effectiveness of instruction. Thus, from the GTM point of view (i.e., maximizing instructional efficiency), the norm-referenced evaluation system is of little value. However, some kind of information regarding a student's position relative to other students in the area of academic performance appears to be needed for a variety of seeming vital functions. Perhaps this kind of information should be generated in courses and subjects which do not

require all students to meet a particular level of mastery--or in courses where students are permitted to go beyond a required standard. Possibly standardized academic ability or achievement tests can eventually provide such information and the results of instructional evaluation could be used only for determining the effectiveness of instruction and when students have achieved specified objectives.

In conclusion, it should be re-emphasized that:

(1) It is the success of the instruction which is being evaluated.

(2) Unsuccessful instruction is probably a result of one of the following reasons:

   a. Students did not have the prerequisites necessary to begin the unit.

   b. The instructional activities were inadequately designed.

   c. The instructional activities were inadequately implemented.

(3) Changes in objectives, pre-assessment, and instructional procedures should be made, if necessary, so that the most students achieve the most objectives possible.

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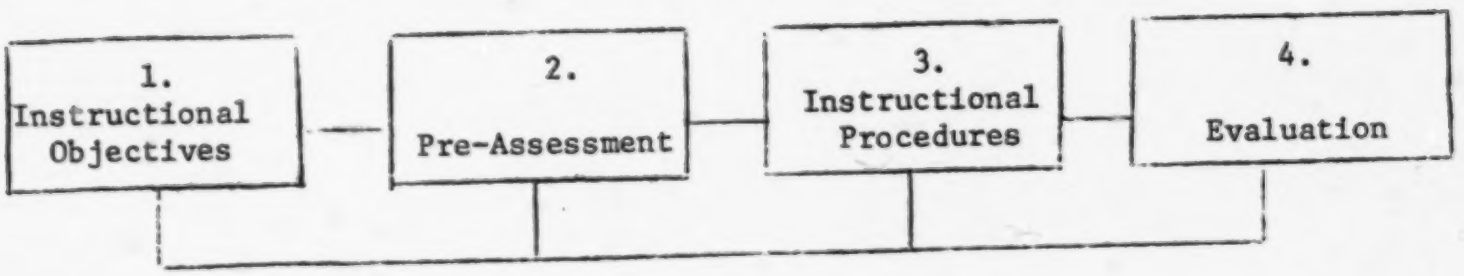
The following Filmstrip-Tape Programs produced by Vimcet Associates P.O. Box 24714, Los Angeles, California 90024.

#16 Modern Measurement Methods
#7 Evaluation

Summary and Conclusion

The purpose of this paper was to present an overview of the General Teaching Model. Hopefully, the following summary of the Model makes more sense to the reader now than it did back on Page 3!



1. Instructional Objectives. Instructional objectives are first identified and selected on the basis of an analysis of desired learning outcomes, and then specified in behavioral terms.

2. Pre-Assessment. Prior to beginning instruction, learners are pre-assessed to determine whether they possess the prerequisite knowledge and skill to begin instruction, or whether they have already mastered some of the instructional objectives.

3. Instructional Procedures. Instructional activities are designed to help learners efficiently achieve the specified objectives. Instructional principles, such as motivation, practice, graduated sequence, feedback etc., plus an analysis of the effectiveness with which the instructor employs various instructional methods (e.g., lecture, discussion, independent study), are employed in the design and implementation of instruction.

4. Evaluation. Instruction is evaluated for efficiency in getting as many students as possible to master as many objectives as possible. Based on the results of an evaluation, modifications are made in the objectives, pre-assessment, and/or instructional procedures, as needed to further maximize instructional efficiency.

It is also hoped that the reader is presently considering the possibility of seeking further information regarding the various elements of the GTM, and/or actually using the GTM. And in reference to these possibilities, it should again be mentioned that there are probably as many variations in the

specific implementation of each component of the GTM as there are people using it. But the four fundamental ideas of (1) specifying behavioral objectives, (2) pre-assessing, (3) designing instruction to achieve the objectives, (4) evaluating the achievement of objectives and continually refining each component to maximize instructional efficiency, appear to be common to all applications of the Model.

One criticism which has been leveled at earlier presentations of the GTM is that no alternative models of teaching have been offered. The essential reason that other models have not been presented is that the writers consider the GTM better than any others with which they are familiar. And perhaps by showing five alternative models, the reason for this conviction may become more evident.

Alternative Models of Teaching

1. Instruction

2. Instruction → Evaluation

3. Objectives → Instruction

4. Objectives → Instruction → Evaluation

5. Objectives → Pre-Assessment → Instruction

Objectives → Pre-Assessment → Instruction → Evaluation

Of course, any of the five models is perfectly valid if the teacher is not concerned with the effectiveness of his teaching. And in all fairness it must be admitted that an approach such as model one has some appealing qualities. Here the teacher only takes the responsibility for offering instruction--whether what is presented is relevant to the student, or whether the student learns, is up to the student. The teacher is much like a book or a film which the student can select and gain much or little from. Perhaps the most appealing thing about this model is that it would seem to foster a good deal of responsibility and a minimum of teacher dependence within the student. If one's goal was to produce students who are self-motivated, self-directed, and self-evaluating, then such a model might appear to be the best one available. But unfortunately, without specifying an objective such as this, or pre-assessing or evaluating, one could never find out whether the instruction was producing such a result.

Of the five alternative models, number two and four are probably the most commonly used. In number two the instructor usually decides what to teach on the basis of what he knows well, or what is of interest to him. Then after instruction, he evaluates how much his students learned. Based on your present knowledge of the GTM, the inadequacies of this and the other alternative models should be apparent.

Several schools, industrial organizations, educational research and development centers, and research laboratories are developing and field-testing individualized materials for most elementary and secondary subjects plus many college and industrial areas. Soon schools and individual educators should be able to select and institute individualized programs (including objectives, pre-tests, instructional materials and guides, and evaluation instruments) for any individual course or entire course sequence. This will obviously reduce a great deal

of the teacher's responsibility for the design and development of materials and procedures. Nevertheless, instructors will have to adapt, test, and continually update these materials and procedures. Thus, proficiency in the design as well as the implementation of instruction will continue to be necessary for most instructors.

Hopefully, it has been made clear that the successful application of the GTM does not involve the application of one simple formula. As a matter of fact, instead of simplifying the task of the teacher, it very likely increases the complexity of teaching and perhaps requires more creativity and resourcefulness than is required by any other approach to the design and implementation of instruction.

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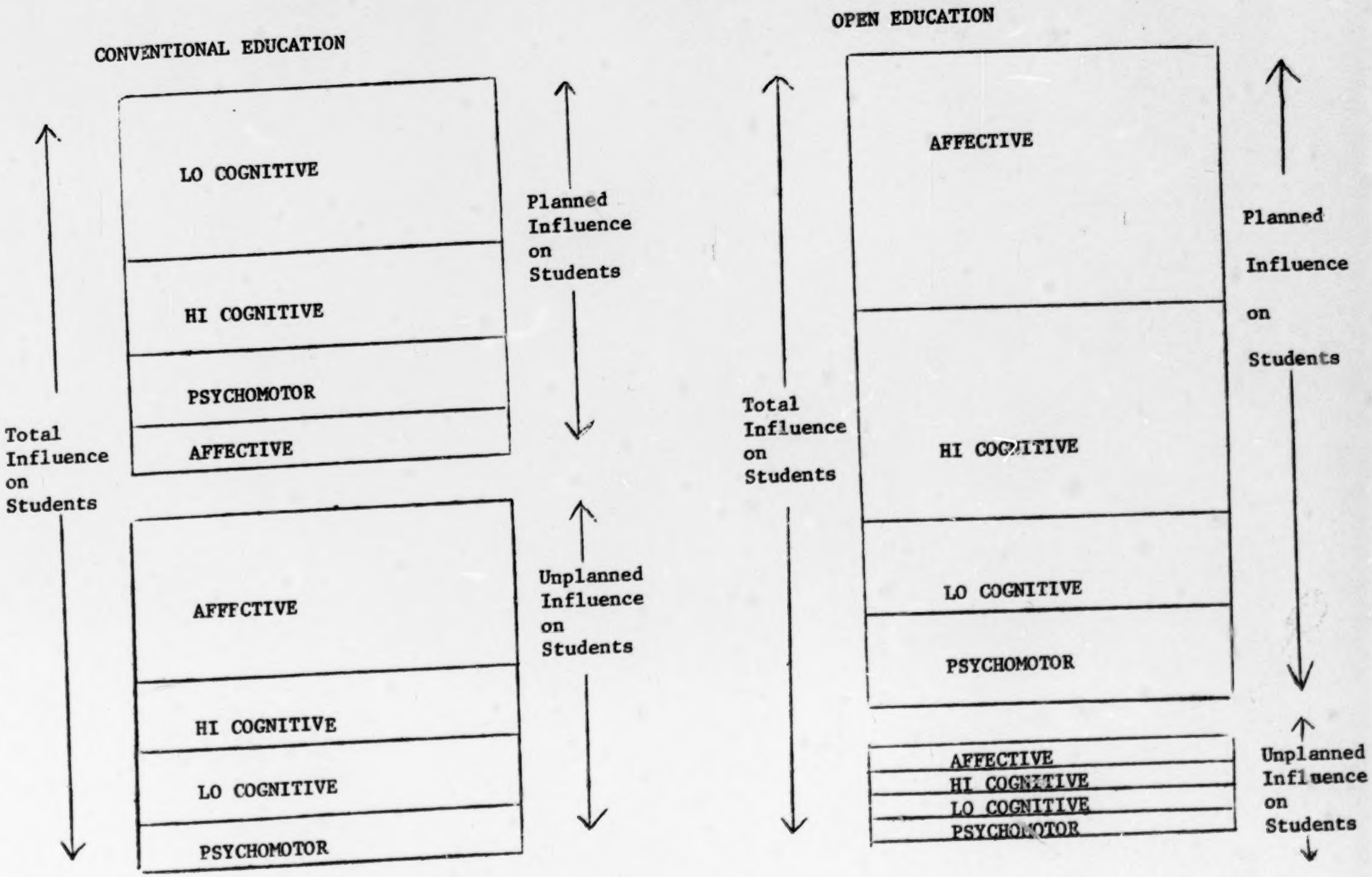
RECENTLY RECOGNIZED LIMITATIONS OF THE GTM
(June 1971)

The general logic of the GTM, namely pre-specifying objectives, pre-assessing learners, designing instruction to achieve the objectives and evaluating the effectiveness of the instruction appears to still be quite sound. However, many of the specific conceptions and recommendations under each component of the model appear to be less universal in their application than we had originally thought. The most apparent limitation of the GTM appears to be in supplying instructional guidelines for instruction in which affective goals are considered highest in priority.

For example, education programs such as those associated with the British Primary School, or programs with such labels as open, free, informal or humanistic education, (described in Crisis in the Classroom by C. Silberman) typically identify such goals as the development of favorable attitudes toward selves, others, learning, inquiry, self-development, etc., as the primary objectives of their programs. The traditional cognitive goals associated with reading, writing, and arithmetic are also considered important -- but lower on the priority list of objectives.

By priorities, we mean the amount of emphasis (time, energy) allotted to achieving particular objectives rather than a list of written objectives in a curriculum catalogue which have little relationship to what is actually done in a classroom. The diagram on the next page illustrates a gross comparison between open and conventional education in terms of priorities of objectives using the behavioral domains and taxonomy classification of educational objectives from Bloom and Krathwohl.

PRIORITIES OF OBJECTIVES IN CONVENTIONAL AND OPEN EDUCATION



One major difference between open and conventional education shown in this diagram is that a much larger proportion of the total influence of the school on the students is planned in the open school. Within many conventional schools, little effort and few instructional decisions are made on the basis of producing affective outcomes. Nevertheless, students are acquiring attitudes about themselves, learning, society, plus personal values and motivational styles, many of which are considered less than desirable. Open schools, on the other hand, typically place such affective goals as self-concept, self-directedness, curiosity, resourcefulness, creativity, responsibility, and sensitivity in a position of highest priority and thus plan much of the educational procedures to facilitate achieving these outcomes. Similarly, open schools devote considerable emphasis to high level cognitive skills such as learning to learn, problem solving, critical thinking, social and communication skills. Conventional schools appear to place a great deal more emphasis on low level cognitive outcomes such as the acquisition of knowledge.

Thus one major limitation of the GTM is the lack of attention paid to priorities of objectives in educational programs and the influence of such priorities on the design, implementation and evaluation of instruction.

It might also be pointed out here that the open school model described above has been interpreted by many people to be in direct contradiction to the objectives-based philosophy of the GTM.

The important feature of open schools which may have confused many people is that students appear to make the major decisions regarding what they learn. In part this is true--students do make many of the decisions as to what specific activities they will engage in during school. However, the decisions regarding

the affective and high level cognitive goals are made by teachers and others. The student does not have a choice of whether he will acquire a healthy self-concept, become self-directing, learn to enjoy school, or acquire creative problem-solving skills. In fact, it is these priority decisions by teachers that result in procedures in which students are given considerable freedom and responsibility to select what they will pursue each day. Of course these decisions by students are also influenced by higher priority teacher objectives. The arrangement of the environment, the availability of various materials, the powerful influence of older children joyfully engaged in productive learning, the teacher's style of inquiry and interaction, all exert a powerful influence on what students do and how they do it. Certainly different open schools emphasize different objectives in all domains, but the major arrangement of priorities appear to be fairly consistent.

The second major limitation of the GTM which we have recently recognized is closely related to the first -- namely the lack of prescriptive instructional principles for achieving affective objectives. Although some of the material under the ten principles for designing instructional procedures is applicable to affective goals much of it is not. For example, with principle number three "Providing a Model of Terminal Performance," it would be quite reasonable from a social learning point of view, to provide models of joyful, self-directed inquirers to attempt to foster joyful self-directed inquiry in students. Similarly opportunities to practice and obtain feedback would be desirable to facilitate achievement of many affective goals. However, the principles of graduated sequence and teaching performance as well as several suggestions under other principles appear to be primarily applicable for the achievement of cognitive

goals. Thus we feel that a set of instructional principles based on affective learning theory need to be added to the GTM.

The third problem with the GTM is a lack of information dealing with the assessment of affective goals. Evaluating affective behavior is a considerably more complex task than that of assessing cognitive achievement. Correspondingly, the development of evaluative instruments and techniques for the affective domain is well behind that of the cognitive domain. Thus if we are to maintain what we consider nearly sacred in our philosophy -- i.e., objectives must be measurable--more attention must be given to evaluation in the affective domain. In addition such issues as criterion vs. norm referenced evaluation, individual vs. group objectives, need further examination in light of affective-goal priority programs.

It is presently stated in the GTM that when students select their own objectives that they should state their objectives in precise behavioral terms. This may often be an unrealistic endeavor. Students frequently are unable to define the specific outcomes they would like to achieve prior to investigating some topic or area. Although it is possible, and generally desirable, for students to describe the competency they have acquired after acquiring it, it is often impossible to define the precise competence they wish to achieve in advance. This does not mean that students should not be encouraged to prescribe what they would like to learn in advance--rather it is suggested that a great deal of latitude be permitted in the degree of specificity with which they pre-specify their personal learning objectives. Objectives such as "to learn how to make 8 mm films," "to find out why eastern religions are so popular today" or "to investigate the influence of TV advertizing on children's attitudes

regarding competition" would seem to be reasonable statements for student selected objectives.

Finally, and perhaps most significantly, we no longer feel that tools, models, techniques -- such as the GTM -- should be presented in a value vacuum. Presently the GTM takes no position on what ought to be taught -- particularly in public schools. We have observed cases in which teachers have greatly increased the efficiency of their students in achieving what we consider untenable objectives. Moreover this is often done in such a way as to have a negative influence on student attitudes and values which we feel are immensely more important than most cognitive capabilities. Therefore, our next revision of the GTM will very likely become much less "general" as a result of our taking a value position regarding the priorities of objectives in education.